J Hosp Palliat Care 2024 March:27(1):1-10
https://doi.org/10.14475/jhpc.2024.27.1.1

Review Article

pISSN 2765-3072 • eISSN 2765-3080

Palliative Care for Adult Patients Undergoing Hemodialysis in Asia: Challenges and Opportunities

Wei-Min Chu, M.D., MSc, Ph.D.[*,†,‡,§,‖], **Hung-Bin Tsai**, M.D., MSc, Ph.D.[¶], **Yu-Chi Chen**, R.N., MSc, Ph.D.[**], **Kuan-Yu Hung**, M.D., Ph.D.[††,‡‡], **Shao-Yi Cheng**, M.D., MSc, Dr.PH.[§§] and **Cheng-Pei Lin**, R.N., MSc, Ph.D.[‖‖,¶¶]

[*]Department of Family Medicine, Taichung Veterans General Hospital, Taichung,
[†]College of Medicine, National Yang Ming Chiao Tung University, Taipei,
[‡]Department of Post Baccalaureate Medicine, College of Medicine, National Chung Hsing University,
[§]School of Medicine, Chung Shan Medical University, Taichung, Taiwan,
[‖]Department of Epidemiology of Aging, National Center for Geriatrics and Gerontology, Obu, Aichi, Japan,
[¶]Division of Hospital Medicine, Department of Internal Medicine, National Taiwan University Hospital,
[**]Institute of Clinical Nursing, College of Nursing, National Yang Ming Chiao Tung University,
[††]Graduate Institute of Clinical Medicine, College of Medicine, Taipei Medical University, Taipei,
[‡‡]Division of Nephrology, Department of Internal Medicine, Shuang Ho Hospital, Taipei Medical University, New Taipei City,
[§§]Department of Family Medicine, College of Medicine and Hospital, National Taiwan University,
[‖‖]Institute of Community Health Care, College of Nursing, National Yang Ming Chiao Tung University, Taipei, Taiwan,
[¶¶]Cicely Saunders Institute of Palliative Care, Policy and Rehabilitation, King's College London, London, United Kingdom

This article underscores the importance of integrating comprehensive palliative care for noncancer patients who are undergoing hemodialysis, with an emphasis on the aging populations in Asian nations such as Taiwan, Japan, the Republic of Korea, and China. As the global demographic landscape shifts towards an aging society and healthcare continues to advance, a marked increase has been observed in patients undergoing hemodialysis who require palliative care. This necessitates an immediate paradigm shift to incorporate this care, addressing the intricate physical, psychosocial, and spiritual challenges faced by these individuals and their families. Numerous challenges impede the provision of effective palliative care, including difficulties in prognosis, delayed referrals, cultural misconceptions, lack of clinician confidence, and insufficient collaboration among healthcare professionals. The article proposes potential solutions, such as targeted training for clinicians, the use of telemedicine to facilitate shared decision-making, and the introduction of time-limited trials for dialysis to overcome these obstacles. The integration of palliative care into routine renal treatment and the promotion of transparent communication among healthcare professionals represent key strategies to enhance the quality of life and end-of-life care for people on hemodialysis. By embracing innovative strategies and fostering collaboration, healthcare providers can deliver more patient-centered, holistic care that meets the complex needs of seriously ill patients within an aging population undergoing hemodialysis.

Key Words: Palliative care, Renal dialysis, Global health, Aged

Received January 18, 2024
Revised February 3, 2024
Accepted February 3, 2024

Correspondence to
Cheng-Pei Lin
ORCID:
https://orcid.org/0000-0001-5810-8776
E-mail: cheng-pei.lin@nycu.edu.tw

Funding/Support
This work was partially supported by the National Science and Technology Council in Taiwan (grant number: MOST 111-2314-B-A49 -012 -MY3).

INTRODUCTION

The expanding older population is associated with an increased duration of chronic disease care. As individuals age and diseases progress, kidney function often deteriorates. The combination of multiple comorbidities and the aging process complicates dialysis treatment, adding to its complexity. Symptoms, along with dietary and fluid restrictions, substantially diminish quality of life (QoL) for older patients. Poor physical condition among those undergoing dialysis can lead to complications, compromising the efficacy of treatment and increasing the risk of emergencies or mortality. According to the World Health Organization's Global Health Estimates, kidney disease represented the tenth leading cause of death worldwide in 2019. The number of deaths attributed to kidney disease increased from approximately 813,000 in 2000 to 1.3 million in 2019 [1]. Furthermore, the global number of disability-adjusted life years lost due to kidney disease climbed from around 19 million in 1990 to 33 million in 2013 [2]. Dialysis, encompassing both hemodialysis and peritoneal dialysis, remains the primary treatment for advanced kidney disease, with hemodialysis being the more common approach. By 2030, the number of patients requiring dialysis in Asia is predicted to be between 1.571 and 3.014 million, contributing to a global total of 5.5 million cases [3]. In this context, and with healthcare systems emphasizing the quality of end-of-life (EOL) care, the provision of palliative care for patients on dialysis is becoming increasingly important.

Over the past 50 years, palliative care has improved both QoL and support for patients with cancer and their families. However, as the global population ages, demand is rapidly escalating for comprehensive palliative care for patients with noncancer diagnoses. This demographic shift underscores the urgent need to integrate early palliative care into the routine management of these patients, with an emphasis on improving the quality of care [4]. Patients living with kidney-related diseases are receiving increased attention from palliative care professionals due to the rising number of patients and the growing complexity of their care needs.

While dialysis treatment can prolong life, the long-term progression of the disease—especially as patients age or face increasing comorbidities—has substantial physical and psychological effects. As a result, maintaining a high QoL becomes increasingly challenging. Consequently, integrating palliative care to provide comfort and high-quality EOL management is essential. This strategy aims to address the comprehensive needs of patients undergoing dialysis, with the goal of improving their overall well-being during this critical phase of their healthcare journey.

EPIDEMIOLOGY OF PEOPLE RECEIVING HEMODIALYSIS IN ASIA: TAIWAN, JAPAN, THE REPUBLIC OF KOREA, AND CHINA

The number and proportion of individuals undergoing hemodialysis have risen substantially in the East and South Asia regions. This trend may be associated with local challenges in diabetes management, obesity, and rapid economic growth, with a concomitant increase in access to renal replacement therapy [5]. To illustrate this increasing trend, we will focus on Taiwan, Japan, the Republic of Korea, and China as examples.

Taiwan is frequently referred to as the "Kingdom of Dialysis." The number of individuals undergoing dialysis treatment in Taiwan rose from 68,962 in 2010 to 88,880 in 2020. This corresponds to an incidence rate of 525 per million population and represents the highest annual growth rate in the world, at over 2% [6]. The cost of these treatments, which is subsidized by Taiwan's National Health Insurance, also increased from $30.8 billion to $39.3 billion annually [7].

In Japan, the number of patients on chronic hemodialysis has consistently increased each year. In 2017, Japan had approximately 2,640 of these patients per million population [8]. By 2018, the prevalence rate in Japan had reached 2,687.7 per million population, marking the second-highest prevalence rate of patients on dialysis in the world after Taiwan [9].

In Korea, the prevalence of hemodialysis has also markedly increased over the past decade, reflecting a broader trend in the rise of end-stage renal disease (ESRD). From 2014 to 2018, the number of patients undergoing hemodialysis grew from 74,013 to 90,901, representing a 22.8% increase and signaling growing healthcare demands [10]. Concurrently, medical costs associated with hemodialysis have surged, increasing by 45.5% over the same period. By 2019, the population of patients with

https://doi.org/10.14475/jhpc.2024.27.1.1

ESRD had exceeded 100,000, effectively doubling the figure from 2010.

In China, the prevalence of hemodialysis has risen substantially over the past decade, reflecting the increasing burden of chronic kidney disease (CKD). Between 2013 and 2017, the age- and sex-standardized prevalence of patients on dialysis increased from 255.11 to 419.39 per million population. The actual prevalence in 2012 was 237.3 per million, which itself represented a substantial rise from 33.2 per million in 1999. Major cities, such as Beijing and Shanghai, reported even higher rates in 2011, highlighting the challenges faced in urban areas [11,12].

Asia has experienced the world's fastest growth in the number of patients undergoing hemodialysis, along with a growing demand for palliative care. It is crucial to comprehend the disease symptoms, needs associated with palliative care, and challenges involved in providing such care, and then consider potential solutions and opportunities.

SYMPTOM BURDEN AND PALLIATIVE CARE NEEDS OF PATIENTS UNDERGOING HEMODIALYSIS

The primary function of the kidney, an essential organ system in the human body, is the purification of blood. Proteins derived from food, as well as metabolic waste generated internally, enter the bloodstream and are subsequently filtered by the kidneys, which remove excess nitrogenous waste from the blood. When the kidneys are damaged, numerous symptoms can arise, placing a heavy symptomatic burden on patients with CKD. Despite its status as an advanced treatment, hemodialysis can result in both physical and psychosocial discomfort for patients requiring the procedure. Early intervention with palliative care may effectively address these symptoms and fulfill care needs.

1. Physical burden and comorbidities among patients on hemodialysis

1) Pain

Pain is the primary symptom reported by patients undergoing hemodialysis. This pain can be categorized into three distinct types: (a) pain directly associated with the hemodialysis procedure, (b) pain related to vascular access, and (c) pain that arises as a secondary consequence of renal disease or its complications [13]. An effective pain management strategy is crucial for enhancing patient compliance with the hemodialysis regimen and can substantially improve the overall treatment experience. Furthermore, optimal pain management is essential for promoting the physical, mental, and emotional well-being of patients [14].

2) Infection

Infection is another major complication of hemodialysis, representing a significant health burden for patients with ESRD. Infection accounts for approximately 3% to 11% of mortality in this population, making it the second leading cause of morbidity [15]. Notably, the incidence of sepsis in individuals with ESRD is around 100 times greater than in the general population. This increased susceptibility is associated with roughly 75% of the mortality in patients with ESRD who develop any form of infection [16]. Infections can cause symptoms such as fever, fatigue, and generalized discomfort in those undergoing hemodialysis.

3) Cognitive impairment

Cognitive impairment is also a key clinical concern for patients on hemodialysis. The prevalence of cognitive impairment among individuals with CKD is remarkably high, with rates varying from 10% to 40% across CKD stages. Importantly, both a low estimated glomerular filtration rate (eGFR) and albuminuria are recognized as independent risk factors for cognitive impairment. The highest prevalence of cognitive impairment is observed among patients with kidney failure who require dialysis [17].

4) Anemia and bleeding risk

Patients undergoing hemodialysis also face a high incidence of anemia and bleeding incidents. Renal anemia, primarily attributed to the relative insufficiency of endogenous erythropoietin secretion, is the most prevalent complication among patients with CKD. Renal anemia generally begins to be observed when eGFR falls below 60 mL/min [18]. Notably, over 90% of patients with CKD for whom eGFR is 30 mL/min or less are considered to have renal anemia, which can cause

fatigue, shortness of breath, and decreased cognitive function. Additionally, individuals with CKD experience an elevated risk of bleeding, a condition primarily caused by impaired platelet function and abnormal interactions between platelets and the vessel wall [19]. Although the clinical presentation of this complication often includes minor bleeding from the skin and mucous membranes, more severe manifestations, such as gastrointestinal or cerebral hemorrhage and bleeding at other systemic sites, are also frequently reported [20]. Such bleeding episodes can provoke fear, depression, and anxiety in both patients and their family members.

5) Comorbidities and complications

In addition to these physical burdens, patients undergoing hemodialysis also contend with various comorbidities and associated treatments, including hypotension, gastrointestinal lesions and Helicobacter pylori infections, heart failure, and functional impairments. Previous studies have demonstrated that patients with ESRD frequently undergo invasive procedures such as intubation, mechanical ventilation, cardiopulmonary resuscitation, and admission to intensive care units shortly before death [21].

2. Psychosocial and spiritual care needs of patients on hemodialysis

Patients with CKD face substantial psychological challenges at every stage of the disease, affecting their overall well-being. These challenges include grappling with a life-threatening diagnosis, enduring lifelong treatment, navigating various dialysis techniques, and coping with the side effects and complications of treatment. Consequently, the management of CKD and ESRD extends beyond the clinical aspects of the condition, necessitating a holistic approach that prioritizes and maintains the patient's QoL from diagnosis to EOL care [22].

1) Depression

Depression is a notable comorbidity among patients undergoing hemodialysis. In fact, depression represents the most common psychological challenge faced by this patient population. The prevalence of major depression is markedly elevated in individuals with CKD and ESRD, with rates ranging from 24% to 50% [23]. Furthermore, research indicates a substantial correlation between depression and increased mortality rates in patients with CKD and ESRD [24].

2) Anxiety

Kimmel et al. [25] demonstrated that anxiety disorders were prevalent among the US Medicare population with ESRD. Cukor et al. reported that 27% of patients undergoing hemodialysis developed an anxiety disorder [26].

Suicide represents an extremely severe consequence of depression and anxiety, and a heightened suicide rate is associated with a diminished QoL. Empirical evidence indicates a notably high incidence of suicide threats and attempts among patients receiving hemodialysis [27].

3) Spiritual care needs

Previous studies have indicated that patients with advanced kidney disease often have numerous unmet spiritual needs. Furthermore, higher levels of spirituality have been linked to greater QoL across physical, psychological, social, and environmental domains [28]. Scherer et al. [29] conducted a survey of 927 American patients undergoing dialysis and discovered that those who placed greater importance on religious or spiritual beliefs were more inclined to favor resuscitation, tended to prefer a shared decision-making role, and were less likely to have considered or discussed the cessation of dialysis. However, caution should be exercised when providing care in varying religious or spiritual contexts, as the same beliefs may hold different meanings across cultures.

CHALLENGES IN PALLIATIVE CARE PROVISION FOR INDIVIDUALS ON HEMODIALYSIS

Palliative care is beneficial for managing renal symptoms and should be considered a key component of integrated kidney care. However, clinicians often find it difficult to initiate conversations about palliative care with patients receiving hemodialysis, leading to low and delayed adoption of these services worldwide. Challenges identified in providing palliative care to patients on hemodialysis include:

https://doi.org/10.14475/jhpc.2024.27.1.1

1. Difficulties with prognostic prediction delaying timely palliative care referral

Predicting patient prognosis is a challenging task that often delays the provision of access to palliative care. The complex progression of renal disease and the unpredictable responses to treatment prevent patients from receiving palliative care earlier in their course of treatment [30]. In Asia, clinician prediction of survival is one commonly used prognostic approach. While validated prognostic models are available to support survival prediction—including the Surprise Question, Charlson Comorbidity Index, Palliative Performance Scale, Palliative Prognostic Score, Palliative Prognostic Index, and so on—few are routinely employed to refer renal patients to palliative care [31]. Moreover, when these models are used individually, their accuracy is limited, and complexities may be associated with selecting, computing, and interpreting the appropriate model [31]. Notably, most of these models were originally developed and validated for patients with cancer, not for those with kidney disease.

2. Diagnosis-based referral that is delayed and often too late

In clinical settings, palliative care is often initiated for patients with ESRD when they become ventilator-dependent, experience severe multimorbidity, are frail and bedridden, or choose to discontinue hemodialysis [32]. In these cases, palliative care is provided at a very advanced stage of illness. Although hemodialysis is remarkable in its capacity to extend life, the prognosis for patients who stop treatment is usually very poor, with a predictably short remaining lifespan. For example, a study of a US national database showed that, on average, patients with ESRD receive hospice care for only 3 days before death [33]. As a result, patients, their caregivers, and healthcare providers have limited time for meaningful discussions and preparations, which adversely impacts the quality of EOL care.

3. Cultural and social influences on renal palliative care access

In Asia, palliative care is commonly misunderstood as applying exclusively to patients at the EOL, and some view the pursuit of palliative care as an admission of treatment failure. Society generally regards palliative care as suitable only for individuals with life-threatening diseases, whereas those undergoing hemodialysis are seen as managing a chronic condition that is not life-threatening. The stigma associated with palliative care and advance care planning (ACP), which may imply a cessation of active treatment and abandonment of patients, can evoke fear and shock when palliative care is suggested. These adverse perceptions substantially postpone patients' access to palliative care, hindering early preparation for future care needs [34]. Furthermore, in Asia, family-led decision-making is the norm in ACP discussions, often leaving patients with renal disease little opportunity to express their wishes for palliative care, thereby limiting their access to these services.

4. Inadequate palliative care training and low confidence among nephrology clinicians

Although nephrology practitioners reported a positive attitude toward supporting palliative care, they also expressed a lack of confidence and training in providing such care to patients undergoing hemodialysis. A survey conducted in China involving 657 nephrology medical staff members found that a mere 4.3% of participants felt confident in their ability to provide palliative care to patients on hemodialysis [35]. Clinicians are often required to make a rapid transition from active treatment to palliative care, as patients' conditions can deteriorate quickly once hemodialysis is discontinued.

5. Lack of interprofessional collaboration and communication

Limited communication and collaboration between nephrology and palliative care teams can compromise the quality of patient care. Nephrology teams frequently regard hemodialysis primarily as a life-prolonging treatment and may show little inclination to collaborate with palliative care teams. This misalignment in perspectives overlooks the potential benefits of palliative care. Disparities in the understanding and perceptions of renal disease treatment have a meaningful impact on the referral to and utilization of palliative care services.

6. Contextual differences in ACP and EOL decision-making

ACP is an essential communication tool that enables patients and their healthcare teams to explore life goals and preferences for future care. The ACP process includes various elements, such as advance directives, the designation of a healthcare agent (also known as a medical surrogate, Lasting Power of Attorney, or Donee, depending on the local jurisdiction), and crucial medical decision-making related to EOL care. This may involve decisions about the timing of dialysis withdrawal, do-not-resuscitate orders, and physician orders for life-sustaining treatment [36].

However, navigating conflicting future care wishes among patients, families, treatment teams, and palliative care teams presents contextual challenges. For example, Asian patients may be hesitant to make their own EOL care decisions, often preferring to delegate this authority to significant others, such as family members, close friends, or medical teams, to act in their best interest. Discrepancies in expectations regarding illness and treatment, as well as differing perceptions of what constitutes good QoL between significant others and patients, complicate the decision-making process and can lead to a decrease in service uptake.

7. Underdeveloped system, measurement, and model of care for seriously ill patients undergoing hemodialysis

Palliative care development and funding are primarily allocated to cancer-related diseases. A tailored care model for individuals undergoing hemodialysis is notably lacking within these frameworks. Furthermore, palliative care is often not considered a primary goal of renal care, as most care models emphasize dialysis preparation over palliation. As a result, patients and their family caregivers are frequently underprepared for receiving palliative care during advanced stages of illness [35]. Additionally, the financial burden associated with operating a palliative care service for patients on hemodialysis deters many organizations from offering such care. Validated measures to assess the quality of palliative care for these patients are rarely used in clinical practice [37]. Lastly, an unprepared legal system impacts clinicians' readiness to provide renal palliative care, with medical disputes arising before or after the withdrawal of dialysis substantially influencing the availability of these services [30,35].

POSSIBLE OPPORTUNITIES AND FUTURE IMPLICATIONS

Considering these challenges, we suggest the following future actions and opportunities:

1. Adequate training for clinicians to perform timely, need-based patient referrals using a validated screening tool

To enable early palliative care intervention for this population, prognostic tools are required that are specific to renal disease. Selecting the most suitable tool requires careful consideration, as prognostic accuracy can vary based on the patient population, the clinical setting, and the time frame of the prediction [31]. Referrals should also be prioritized based on the patient's needs—such as physical or emotional symptoms, comorbidities, biomedical criteria, psychosocial needs, and functional decline—rather than solely on the diagnosis. This approach aligns with international consensus [38]. For timely referrals to be possible, clinicians must receive comprehensive training that enables them to recognize palliative care needs and to provide prompt and appropriate care to renal patients and their families. Given that clinicians often encounter ethical dilemmas and experience moral distress when supporting patients in palliative care, it is essential to offer them psychological support [30].

2. Telemedicine-assisted shared decision-making and the three-talk model

In Asian cultures, involving the family in the medical decision-making process for patients undergoing hemodialysis is crucial, especially with palliative care decisions such as ACP, palliative dialysis, time-limited trials, dialysis withdrawal, and life-sustaining treatments [34]. Telemedicine-assisted shared decision-making consultations for palliative care have been shown to be both feasible and acceptable for patients undergoing maintenance dialysis. This approach became particularly important following the onset of the COVID-19

https://doi.org/10.14475/jhpc.2024.27.1.1

Table 1. Three-Talk Model for Shared Decision-Making.

Step	Statements
Step 1: Team talk	Apply the "two-minute rule," which requires explaining the condition within two minutes and avoiding overly technical jargon, regardless of complexity. Also incorporate the "50% rule," meaning the leader speaks for no more than 50% of the meeting time. Inquire whether the patient wishes to receive prognostic information about survival time, expected functional status, and disease unpredictability.
Step 2: Option talk	Use decision aids to communicate and discuss possible plans, comparing the risks and benefits of each option. Use "hope - worry" statements to express empathetic concerns when the condition is unpredictable.
Step 3: Decision talk	Confirm the thoughts and preferences of the patient and family and make the most suitable decision based on this information. Clarify care goals, bring the patient or family's excessive expectations back to reality, aim for goal-concordant care, and provide optimal comfort care for the patient.

Source: Chou TJ, Wu YR, Tsai JS, Cheng SY, Yao CA, Peng JK, et al. Telehealth-based family conferences with implementation of shared decision making concepts and humanistic communication approach: A mixed-methods prospective cohort study. Int J Environ Res Public Health 2021;18:10801.

pandemic. Findings support incorporating the "three-talk model" into renal palliative care consultations, which includes (1) team talk, (2) option talk, and (3) decision talk [39] (Table 1).

3. Time-limited trial of "full" dialysis and palliative dialysis

The uncertainty surrounding illness and treatment response heightens psychological distress in patients undergoing hemodialysis and complicates the development of an appropriate care plan. For patients who require dialysis but face an uncertain prognosis or are temporarily indecisive about undergoing dialysis, a time-limited trial may be beneficial. This approach can help alleviate life-threatening situations or provide a short-term solution within a predetermined timeframe. In cases of advanced kidney disease, dialysis does not always lead to an improvement in QoL. For such patients, palliative dialysis may serve as a middle ground between conservative management and full-scale dialysis. The aim of palliative dialysis is to customize treatment to the individual's needs, maximizing QoL while minimizing the burden of treatment and alleviating disease-related symptoms. A family meeting should be held to discuss the patient's future care plan, including the possibility of discontinuing dialysis if poor results become evident. The medical team should proactively seek the patient's input regarding their treatment preferences and experiences with dialysis and support their decisions about continuing or withdrawing from this treatment.

4. Development of a multi-professional concurrent care model integrating palliative care with hemodialysis treatment across care settings

International guidelines recommend integrating palliative care and ACP into routine renal care [40], a practice that has been demonstrated to significantly improve the quality of EOL renal care. To enhance coordination and organization of EOL and palliative care, it is important to develop multi-professional palliative care collaborations that support both patients and their families. Additionally, a blended model of palliative care, which might include a combination of inpatient services and home care for patients on dialysis, has the potential to significantly reduce both the use of aggressive treatments in the 30 days preceding a patient's death and the overall costs associated with care. Therefore, fostering transparent conversations within palliative care and building trusting clinician – family – patient relationships across various professional domains and care settings are crucial for achieving goal-concordant EOL renal care.

CONCLUSION

The rising number of patients undergoing hemodialysis, especially in Asian countries, underscores the critical need for the proactive and thorough integration of palliative care into routine renal care practice. The evolving demographic landscape, characterized by an aging population, necessitates a paradigm shift to address the complex physical, psychosocial, and spiritual care requirements of noncancer patients who

are on hemodialysis. Identified challenges include difficulties in making prognostic predictions, delayed referrals, cultural misconceptions, insufficient clinician confidence and training, and an underdeveloped care infrastructure.

Future opportunities to improve EOL care for patients receiving hemodialysis include enhancing clinician training, utilizing telemedicine for shared decision-making, and adopting innovative care models. Strategies such as implementing time-limited dialysis trials or palliative dialysis, as well as developing multi-professional concurrent care models, show promise in elevating the quality of care. By prioritizing need-induced referrals, integrating palliative approaches into routine renal care, and fostering transparent communication across healthcare professionals, we can provide more effective and compassionate support to patients on hemodialysis and their families. Embracing these changes will not only improve the QoL for these patients but also contribute to a more patient-centered and holistic approach in managing the complexities of serious illness.

ACKNOWLEDGMENTS

We would like to express our gratitude to Enago Editing (https://www.enago.tw/) for their assistance with editing this manuscript for English grammar.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

ORCID

Wei-Min Chu, https://orcid.org/0000-0001-9870-8362
Hung-Bin Tsai, https://orcid.org/0000-0002-0689-8339
Yu-Chi Chen, https://orcid.org/0000-0003-4144-3265
Kuan-Yu Hung, https://orcid.org/0000-0003-3472-5512
Shao-Yi Cheng, https://orcid.org/0000-0002-2224-4140
Cheng-Pei Lin, https://orcid.org/0000-0001-5810-8776

AUTHOR'S CONTRIBUTIONS

Conception or design of the work: WMC, HBT, CPL. Data collection: WMC, HBT, CPL. Data analysis and interpretation: WMC, HBT, CPL. Drafting the article: WMC, HBT, CPL. Critical revision of the article: all authors. Final approval of the version to be published: all authors.

REFERENCES

1. WHO. The top 10 causes of death [Internet]. Geneva: World Health Organization; 2020 [cited 2023 Dec 20]. Available from: https://www.who.int.
2. Luyckx VA, Tonelli M, Stanifer JW. The global burden of kidney disease and the sustainable development goals. Bull World Health Organ 2018;96:414-22D.
3. Filipska A, Bohdan B, Wieczorek PP, Hudz N. Chronic kidney disease and dialysis therapy: incidence and prevalence in the world. Pharmacia 2021;68:463-70.
4. Coventry PA, Grande GE, Richards DA, Todd CJ. Prediction of appropriate timing of palliative care for older adults with non-malignant life-threatening disease: a systematic review. Age Ageing 2005;34:218-27.
5. Thurlow JS, Joshi M, Yan G, Norris KC, Agodoa LY, Yuan CM, et al. Global epidemiology of end-stage kidney disease and disparities in kidney replacement therapy. Am J Nephrol 2021;52:98-107.
6. National Health Research Institutes, Taiwan Society of Nephrology. 2022 Kidney disease in Taiwan annual report. Taipei:National Health Research Institutes, Taiwan Society of Nephrology:2023.
7. Tang SCW, Yu X, Chen HC, Kashihara N, Park HC, Liew A, et al. Dialysis care and dialysis funding in Asia. Am J Kidney Dis 2020;75:772-81.
8. Umebayashi R, Uchida HA, Matsuoka-Uchiyama N, Sugiyama H, Wada J. Prevalence of chronic kidney disease and variation of its risk factors by the regions in Okayama Prefecture. J Pers Med 2022;12:97.
9. Nitta K, Goto S, Masakane I, Hanafusa N, Taniguchi M, Hasegawa T, et al. Annual dialysis data report for 2018, JSDT Renal Data Registry: survey methods, facility data, incidence, prevalence, and mortality. Renal Replacement Therapy 2020;6:41.

https://doi.org/10.14475/jhpc.2024.27.1.1

10. Park JH, Lee YK, Kim K, Kim DJ. Korean Society of Nephrology hemodialysis unit accreditation report (2016-2020) and future directions. Kidney Res Clin Pract 2022;41:165-74.
11. Zhao X, Niu Q, Gan L, Hou FF, Liang X, Ni Z, et al. Baseline data report of the China Dialysis Outcomes and Practice Patterns Study (DOPPS). Sci Rep 021;11:873.
12. Yang C, Yang Z, Wang J, Wang HY, Su Z, Chen R, et al. Estimation of prevalence of kidney disease treated with dialysis in China: a study of insurance claims data. Am J Kidney Dis 2021;77:889-97.e1.
13. Dos Santos PR, Mendon a CR, Noll M, Borges CC, Alves PM, Dias NT, et al. Pain in hemodialysis patients: Prevalence, intensity, location, and functional interference in daily activities. Healthcare (Basel) 2021;9:1375.
14. Kassim MAK, Pantazi AC, Nori W, Tuta LA, Balasa AL, Mihai CM, et al. Non-pharmacological interventions for pain management in hemodialysis: A narrative review. J Clin Med. 2023;12:5390.
15. Midturi JK, Ranganath S. Prevention and treatment of multidrug-resistant organisms in end-stage renal disease. Adv Chronic Kidney Dis 2019;26:51-60.
16. Sarnak MJ, Jaber BL. Mortality caused by sepsis in patients with end-stage renal disease compared with the general population. Kidney Int 2000;58:1758-64.
17. Drew DA, Weiner DE, Sarnak MJ. Cognitive impairment in CKD: pathophysiology, management, and prevention. Am J Kidney Dis 2019;74:782-90.
18. Astor BC, Muntner P, Levin A, Eustace JA, Coresh J. Association of kidney function with anemia: the Third National Health and Nutrition Examination Survey (1988-1994). Arch Intern Med 2002;162:1401-8.
19. Kaw D, Malhotra D. Platelet dysfunction and end-stage renal disease. Semin Dial 2006;19:317-22.
20. Naganuma T, Takemoto Y. New aspects of cerebrovascular diseases in dialysis patients. Contrib Nephrol 2015;185:138-46.
21. Alostaz M, Correa S, Lundy GS, Waikar SS, Mc Causland FR. Time of hemodialysis and risk of intradialytic hypotension and intradialytic hypertension in maintenance hemodialysis. J Hum Hypertens 2023;37:880-90.
22. Alshelleh S, Alhawari H, Alhouri A, Abu-Hussein B, Oweis A. Level of depression and anxiety on quality of life among patients undergoing hemodialysis. Int J Gen Med 2023;16:1783-95.
23. Agganis BT, Weiner DE, Giang LM, Scott T, Tighiouart H, Griffith JL, et al. Depression and cognitive function in maintenance hemodialysis patients. Am J Kidney Dis 2010;56:704-12.
24. Nagy E, Tharwat S, Elsayed AM, Shabaka SAE, Nassar MK. Anxiety and depression in maintenance hemodialysis patients: prevalence and their effects on health-related quality of life. Int Urol Nephrol 2023;55:2905-14.
25. Kimmel PL, Thamer M, Richard CM, Ray NF. Psychiatric illness in patients with end-stage renal disease. Am J Med 1998;105:214-21.
26. Cukor D, Coplan J, Brown C, Friedman S, Cromwell-Smith A, Peterson RA, et al. Depression and anxiety in urban hemodialysis patients. Clin J Am Soc Nephrol 2007;2:484-90.
27. Kurella M, Kimmel PL, Young BS, Chertow GM. Suicide in the United States end-stage renal disease program. J Am Soc Nephrol 2005;16:774-81.
28. Hartiti T, Silfiyani LD, Rejeki S, Pohan VY, Yanto A. Relationship of spiritual caring with quality of live for hemodialysis patients: a literature review. Maced J Med Sci 2021;9(T5):85-9.
29. Scherer JS, Milazzo KC, Hebert PL, Engelberg RA, Lavallee DC, Vig EK, et al. Association between self-reported importance of religious or spiritual beliefs and end-of-life care preferences among people receiving dialysis. JAMA Network Open 2021;4:e2119355.
30. Ducharlet K, Weil J, Gock H, Philip J. Kidney clinicians' perceptions of challenges and aspirations to improve end-of-life care provision. Kidney Int Rep 2023;8:1627-37.
31. Hui D, Paiva CE, Del Fabbro EG, Steer C, Naberhuis J, van de Wetering M, et al. Prognostication in advanced cancer: update and directions for future research. Support Care Cancer 2019;27:1973-84.
32. Tsai HB, Chao CT, Ha DJ, Fu PK. Kidney supportive care for end-of-life renal patients under the epidemic of emerging infectious diseases. Taipei:Taiwan Society of Emergency and Critical Care Medicine;2022.
33. Wachterman MW, Hailpern SM, Keating NL, Kurella Tamura M, O'Hare AM. Association between hospice length of stay, health care utilization, and medicare costs at the end of life among patients who received maintenance hemodialysis. JAMA Intern Med 2018;178:792-9.
34. Lin CP, Evans CJ, Koffman J, Chen PJ, Hou MF, Harding R. Feasibility and acceptability of a culturally adapted advance care planning intervention for people living with advanced cancer and their families: A mixed methods study. Palliat Med 2020;34:651-66.
35. Zhang S, Zhu W, Xia J, Zheng Y, Li X, Chen L, et al. Urgency for kidney palliative care in Chinese maintenance hemodialysis patients. Kidney Int Rep 2023;8:2794-801.
36. Chen LC, Tu IT, Yu IC, Tung TH, Huang HP, Lin YC, et al. The explorations of the awareness, contemplation, self-efficacy, and readiness of advance care planning, and its predictors in Taiwanese patients while receiving hemodialysis treatment. BMC Palliat Care 2022;21:180.
37. Berenguer-Martinez JM, Bernal-Celestino RJ, Leon-Martin AA, Gonzalez-Moro MTR, Fernandez-Calvo N, Arias-del-Campo L, et al. Quality of life and related factors in patients undergoing renal replacement therapy at the hospital general universitario de ciudad real: cross sectional descriptive observational study. J Clin Med 2023;12:2250.

38. Collins A, Hui D, Davison SN, Ducharlet K, Murtagh F, Chang YK, et al. Referral criteria to specialist palliative care for people with advanced chronic kidney disease: a systematic review. J Pain Symptom Manage 2023;66:541-50.e1.
39. Chou TJ, Wu YR, Tsai JS, Cheng SY, Yao CA, Peng JK, et al. Telehealth-based family conferences with implementation of shared decision making concepts and humanistic communication approach: a mixed-methods prospective cohort study. Int J Environ Res Public Health 2021;18:10801.
40. Schell JO, Johnson DS. Challenges with providing hospice care for patients undergoing long-term dialysis. Clin J Am Soc Nephrol 2021;16:473-5.

https://doi.org/10.14475/jhpc.2024.27.1.1